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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,785	06/27/2005	Atsushi Miyake	SUGI-102US	2095

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EXAMINER	
COOK, JONATHON	

ART UNIT	PAPER NUMBER
2886	

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11/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/540,785	MIYAKE ET AL.	
	Examiner	Art Unit	
	Jonathon D. Cook	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5,7,8,10 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,7,8,10 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

Examiner's Note

The objection to the specification listed below was made by the examiner in the previous office action. However, applicant did not address it. The examiner will restate the objection.

Response to Arguments

Applicant's arguments filed 9/20/2007 have been fully considered but they are not persuasive.

Applicant argues that Pingel does not disclose:

a step of picking-up an image reflected, on the glossy plate member, of a grid pattern having an array having a bright portion and a dark portion with a constant pitch and a constant width by using an image pickup device including a CCD pixel array and enabling Xn±α CCD, pixels of the CCD pixel array to correspond to n grids, where X is an integer which satisfies the equation x=4P, P being an integer greater than zero, and n and α are integers greater than zero, thereby generating α moiré fringes, upon picking-up the image of the grid pattern on said image pickup device. (Applicant states as set forth in claim 4, however examiner notes this language is from claim 5. However the point is moot since the language in claim 4 is almost identical); or

image processing means for processing the gray image data inputted from said image pickup device,

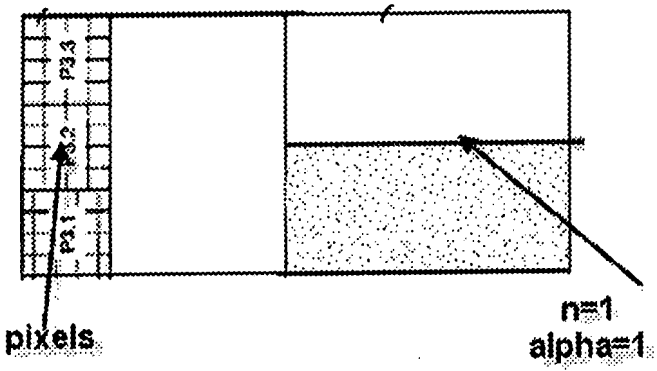
wherein α moiré fringes are generated by the correspondence of Xn±α CCD pixels of the CCD pixel array to n grids upon picking-up the grid pattern to said image pickup device, where X is an integer which satisfies the equation X=4P, P being an integer greater than zero, and n and α are integers greater than zero. (again applicant states this is a limitation from claim 5 when in fact it is from claim 7 as far as examiner can ascertain)

Applicant then goes on to state the problem that is being solved in the instant application. Namely the mismatch between the 4P CCD pixels and the projected grid. Applicant then states that this problem does not exist in Pingel because in Pingel it is stated that the grid frequency of the camera pixels and the grid frequency of the grid are multiples of one another. Whether or not the Pingel addresses the same problem as the instant application is a non-valid argument. The burden for the examiner is merely to show the steps of the method (or the structure of the apparatus) as claimed. This limitation does not appear in the stated claims and therefore this is an invalid argument as to allowability. While claims are read in light of the specification the specification is not to be read into the claims.

Applicant further states that the examiner's arguments are incorrect. Specifically, that if p=1 and three pixels correspond to 1 grid (n=1) then the limitations are not met. Applicant states that if p=1, then (4±α/4) pixels corresponds to one pair of dark and light areas (AKA n=1) of the invention. That if P=1 then n pairs of dark and light areas correspond to 4n±α pixels in the present invention and because α is an integer greater than zero, 4n±α and n are not multiples of one another, as required by Pingel. Examiner

disagrees with this assessment and will attempt to clarify and answer applicant's argument in the following:

First the equation 4±α/4 is not in the claims. The examiner is not even sure of the relevance of this equation. Applicant claims Xn±α, where X=4P (P being an integer greater than 0), n= the number of grids, and α is the number of fringes. As can be seen in the modified figure 2 below, α=1 & n=1. Therefore, Xn±α=3 or 5 (when P=1). As can be seen there fore 3 pixels shown therefore this figure clearly shows Pingel meeting this part of the limitation.



(modified figure 2)

Next, applicant argues because α is greater than 0, then n and Xn±α cannot be multiples of one another. However, as shown above Xn±α=3 & n=1 when α=1. 1 and 3 are multiples of each other therefore the limitation does hold true. If you were to extrapolate that for the case of n=2, then you get α=2, & Xn±α=6 and the limitation is still met.

Lastly, applicant argues that moiré fringes are generated when the output of a line sensor camera is indicated as one-dimensional gray data, and one peak of moiré

appears each time one CCD pixel is deviated, as described in paragraph [51] of the instant application. Then applicant's states that because Pingel does not disclose or suggest this limitation of claims 4, 5, 10, and 11 these claims are not subject to rejection under U.S.C. 102(b) in view of Pingel. However, examiner disagrees. As applicant states this limitation is being read from the specification. This limitation does not appear in the stated claims and therefore this is an invalid argument as to allowability. While claims are read in light of the specification the specification is not to be read into the claims.

In summation examiner disagrees with applicant's arguments that the limitations as stated above are not shown in Pingel. Therefore, the U.S.C. 102 (b) rejection of claims 4, 5, 10, & 11 is maintained.

Applicant argues that for similar reasons as above the U.S.C. 103(a) rejection of claims 1, 2, 7, & 8 should be withdrawn and for similar reasons as stated by examiner above the rejection is maintained.

Specification Objections

The disclosure is objected to because of the following informalities:

The claim to priority to the PCT/JP03/16015 needs to be amended into the first line of the specification as under CFR 1.78 or submitted into the application data sheet as under CFR 1.76.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 4, 5, 10, &11 rejected under 35 U.S.C. 102(b) as being anticipated by **Pingel et al** (WO98/17993) (Pingel).

Regarding **Claims 4, 5, 10, &11**, Pingel discloses and shows in **figs. 1 & 2** an estimating method of the amount of optical distortion of light transmitted through a windshield (**3**) (applicant's transparent glass member) with unevenness of refractive power of the windshield, comprising:

a step of picking-up an image of a grid pattern having an array having a bright portion and a dark portion with a constant pitch and a constant width (see modified ***figure 2*** *below) by using an image pickup device including a CCD pixel array and enabling $Xn\pm\alpha$ CCD pixels to correspond to n grids, where X is an integer which satisfies the equation $X=4P$, P being an integer greater than zero, and n and α are integers greater than zero, thereby generating α moiré fringes, upon picking-up the image of the grid pattern on said image pickup device,*

The moire image which is detected on the camera results from superimposition of two brightness distributions with a specific periodicity, in which case the approximate profiling of sinewave of the moire structure can be recognized on the "grid" of pixels

over the width of a line pair of the sequence which corresponds to a light/dark period (**Page 3, 4th Paragraph**);

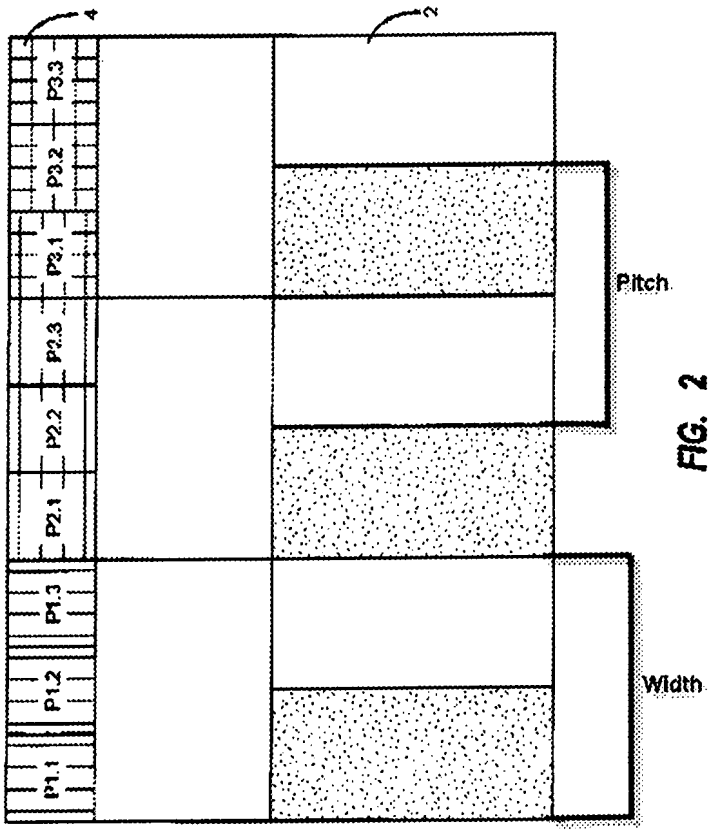


FIG. 2

in the above illustration three pixels correspond to one pair of dark and light areas. In the applicant's disclosure X= 4p (p = 1 or more), in the above illustration each dark and light pair would produce one moire fringe so α=1, therefore if p=1 the limitation is met;

a step of processing, by image processing means, gray image data of the grid pattern picked-up by said image pickup device via said transparent plate member, step of processing by the image processing means comprises:

a step of calculating a plurality of types of sine waves that are deviated in phase at 90° from image data of said moiré fringes,

it is advantageously possible to use the value of the second and third pixels as the value for the record shifted through 120° and 240° (or -120°). These moire image strips, offset through 120° (one third of a complete sine wave) and detected by the pixels of the camera can, after simple conversion, be expressed mathematically as curves that are dependent on a sine function (**Page 3, 5th paragraph**) and,

if the number of pixels associated with a light/dark pair is increased, by a factor of, for example, four (five) or more, this allows an evaluation to be carried out using a phase-shift method shifted in each case by 90° (**Page 3, 8th Paragraph**);

a step of obtaining a phase angle at each pixel based on said plurality of types of sine waves, and

a step of calculating refractive power of the optical distortion based on the difference in phase angles between the pixels,

Variations in the refractive power of the panes, for example a windshield of a motor vehicle, lead to variations in the maxima and minima which occur as a result of the moire phenomenon and can easily be determined as a phase shift (applicants difference in phase angles) in the sine wave; if the distance between the camera and the pane is known, this can be used to determine the angle through which the light that passes through the pane is refracted (**Page 3, Paragraphs 6 & 7**). Thus meeting the limitations of a means for obtaining a phase angle at each pixel based on a plurality of

types of sine waves, and calculating the refractive power or angular deviation of an optical distortion, such as a chipped portion;

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 7, & 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Pingel** in view of **Minato** (US PAT 5,216,481) (Minato).

Regarding **Claims 1, 2, 7, & 8** Pingel discloses and shows in **figs. 1 & 2** an estimating apparatus of the amount of optical distortion of light transmitted through a windshield (**3**) (applicant's transparent plate member) with unevenness of refractive power of the transparent plate member, comprising:

*a light source (**1**) (applicant's means for irradiating) for illuminating a grid pattern (**2**) having an array of bright portions and dark portions with constant pitch and a constant width (see modified **figure 2** above);*

*Camera (**4**) (applicant's means for picking-up said grid pattern which includes a CCD);*

means for inputting a signal from said image pickup device, as gray image data,

another approach to further processing of the lighting pattern, which is preferred owing to its very good resolution, is to use the moire image that occurs on the pixels of the camera. The moire image which is detected on the camera results from superimposition of two brightness distributions with a specific periodicity (**Page 3, 4th Paragraph**). Thus if the data being recorded by the camera is being processed it has been inputted, and since brightness distribution is what matters for this method it would be obvious to use "gray" image data;

*$Xn \pm \alpha$ CCD pixels of the CCD pixel array corresponding to n grids (see modified **figure 2** above),* in the above illustration three pixels correspond to one pair of dark and

light areas. In the applicant's disclosure X= 4p (p = 1 or more), in the above illustration each dark and light pair would produce one moire fringe so α=1, therefore if p=1 the limitation is met;

image processing means comprising:

means for calculating a plurality of types of sine waves that are deviated in phase at 90° from image data of said moiré fringes,

it is advantageously possible to use the value of the second and third pixels as the value for the record shifted through 120° and 240° (or -120°). These moire image strips, offset through 120° (one third of a complete sine wave) and detected by the pixels of the camera can, after simple conversion, be expressed mathematically as curves that are dependent on a sine function (**Page 3, 5th Paragraph**) and,

if the number of pixels associated with a light/dark pair is increased, by a factor of, for example, four (five) or more, this allows an evaluation to be carried out using a phase-shift method shifted in each case by 90° (**Page 3, 8th Paragraph**);

means for obtaining a phase angle at each pixel based on said plurality of types of sine waves, and

means for calculating refractive power of the optical distortion based on the difference in phase angles between the pixels,

Variations in the refractive power of the panes, for example a windshield of a motor vehicle, lead to variations in the maxima and minima which occur as a result of the moire phenomenon and can easily be determined as a phase shift (applicants difference in phase angles) in the sine wave; if the distance between the camera and

the pane is known, this can be used to determine the angle through which the light that passes through the pane is refracted (**Page 3, Paragraphs 6 & 7**). Thus meeting the limitations of a means for obtaining a phase angle at each pixel based on a plurality of types of sine waves, and calculating the refractive power or angular deviation of an optical distortion, such as a chipped portion;

Pingel fails to disclose a means for supporting and conveying said transparent plate member in an optical line ranging from said grid pattern to said image pickup device;

However, Minato teaches and shows in **fig. 2** an apparatus for inspecting transparent objects for defects, comprising:

a conveyor (**3**) (applicant's means for supporting and conveying) for transporting to an inspecting position a transparent glass;

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Pingel with the conveyor for advantages such as the automation of inspection to ensure consistent distance between the camera and glass, and to improve throughput of the inspection process.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathon D. Cook whose telephone number is (571)270-1323. The examiner can normally be reached on Mon-Fri 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on (571)272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jonathon Cook
Patent Examiner
AU:2886
November 13th, 2007

J. C.

TARIFUR CHOWDHURY
SUPERVISORY PATENT EXAMINER